

CLAIMS

1           1. An electronically controlled pedal assembly with hysteresis  
2 comprising:

3                 a housing having a front wall and an arcuate friction wall extending  
4 from an edge of said front wall wherein said friction wall has a radius of  
5 curvature centered on a pedal arm pivot point;

6                 a pedal arm rotatably supported at said pedal arm pivot point by a  
7 mounting means operatively connected to said housing;

8                 a hysteresis generating means pivotally mounted to said pedal arm; and

9                 a spring positioned between said housing and said hysteresis generating  
10 means, wherein said spring biases said hysteresis generating means against said  
11 housing, such that depression of said pedal arm compresses said spring while  
12 generating an increasing frictional hysteresis force between said arcuate  
13 friction wall and said hysteresis generating means that is translated back  
14 through said pedal arm, and release of said pedal arm reduces the frictional  
15 hysteresis force.

1           2. The pedal assembly of claim 1 wherein said hysteresis  
2 generating means is a friction lever pivotally mounted to an outer end of said  
3 pedal arm at a friction lever pivot point.

1           3. The pedal assembly of claim 2 wherein said friction lever  
2 includes an integrally formed main member, a lower member extending radially

3 from a lower end of said main member and an upper arcuate member extending  
4 radially from an upper end of said main member, and an upper surface of said  
5 upper arcuate member is abraded to frictionally engage a surface of said friction  
6 wall housing.

1           4. The pedal assembly of claim 3 wherein said friction lever upper  
2 arcuate member is canted toward said housing friction wall to increase a  
3 frictional hysteresis force when said pedal arm is depressed and reduce the  
4 frictional hysteresis force when said pedal arm is released.

1           5. The pedal assembly of claim 2 wherein said friction lever  
2 includes an integrally formed main member and an upper arcuate member  
3 extending forwardly from an upper end of said main member, and an upper  
4 surface of said friction lever upper member is abraded to frictionally engage  
5 said housing friction wall.

1           6. The pedal assembly of claim 2 wherein said hysteresis  
2 generating means includes:

3           a friction lever pivotally mounted to said pedal arm at a friction lever  
4 pivot point;

5           a push arm pivotally mounted to said pedal arm at a push arm pivot  
6 point that is radially inward from said friction lever pivot point, wherein said

7        push arm is in contact with said friction lever, such that said spring forces said  
8        push arm against said friction lever to generate the frictional hysteresis force.

1              7.        The pedal assembly of claim 1 wherein said pedal arm includes  
2        a disk portion, a lower pedal arm extending from a lower edge of said disk  
3        portion and an upper arm extending from an upper edge of said disk portion.

1              8.        The pedal assembly of claim 1 wherein said mounting means is  
2        a post and bushing.

1              9.        The pedal assembly of claim 1 wherein said hysteresis  
2        generating means includes:

3                a friction wall extending radially from said housing front wall, wherein  
4        said friction wall includes an arcuate frictional surface, and is positioned  
5        between said housing rear wall and said pedal arm; and

6                a friction lever having a first portion pivotally mounted to said pedal  
7        arm and a second portion in frictional contact with said friction wall to generate  
8        a frictional hysteresis force during actuation of said pedal arm.

1              10.      The pedal assembly of claim 1 further comprising:  
2                a cap mounted to said housing;  
3                an alignment post extending radially from a face portion of said cap,  
4        wherein said alignment post aligns said cap with said pedal arm pivot point;

5           a plurality of mounting posts extending radially from said cap face  
6 portion;

7           an induction sensor for sensing the position of said pedal arm  
8 operatively mounted on said cap pedal arm pivot point alignment post and said  
9 cap mounting posts, wherein said induction sensor includes a first rotor and a  
10 second rotor and a stator suspended between said first and second rotors.

1           11.     The pedal assembly of claim 10 wherein said cap alignment post  
2 is operatively supported on said pedal arm mounting means.

1           12.     The pedal assembly of claim 11 wherein said cap includes at  
2 least one slot for securing the cap assembly to said housing in a predetermined  
3 position.

1           13.     The pedal assembly of claim 12 wherein said first rotor includes  
2 a generally planar member with conductive plates positioned above a radially  
3 extending center post, and said second rotor is a generally planar member with  
4 conductive plates positioned thereon relative to said first rotor conductive  
5 plates and a center mounting aperture, and said stator is mounted onto a  
6 generally planar circuit board supported by said cap mounting posts.

1           14.     An electronically controlled pedal assembly with hysteresis  
2 comprising:

3           a housing having a front wall and an arcuate friction wall extending  
4       from an edge of said front wall wherein said friction wall has a radius of  
5       curvature centered on a pedal arm pivot point;

6           a pedal arm rotatably supported at said pedal arm pivot point by a  
7       mounting means operatively connected to said housing, wherein said pedal arm  
8       includes a disk portion, a lower pedal arm extending from a lower edge of said  
9       disk portion and an upper arm extending from an upper edge of said disk  
10      portion;

11          a hysteresis generating means pivotally mounted to said pedal arm,  
12       wherein said hysteresis generating means is a friction lever pivotally mounted  
13       to an outer end of said pedal arm at a friction lever pivot point; and

14          a spring positioned between said housing and said hysteresis generating  
15      means, wherein said spring biases said hysteresis generating means against said  
16      housing, such that depression of said pedal arm compresses said spring while  
17      generating an increasing frictional hysteresis force between said arcuate  
18      friction wall and said hysteresis generating means that is translated back  
19      through said pedal arm, and release of said pedal arm reduces the frictional  
20      hysteresis force.

1           15. The pedal assembly of claim 14 wherein said friction lever  
2       includes an integrally formed main member, a lower member extending  
3       radially from a lower end of said main member and an upper arcuate member  
4       extending radially from an upper end of said main member, and an upper

5       surface of said upper arcuate member is abraded to frictionally engage a  
6       surface of said friction wall housing.

1           16.      The pedal assembly of claim 15 wherein said friction lever  
2       upper arcuate member is canted toward said housing friction wall to increase a  
3       frictional hysteresis force when said pedal arm is depressed and reduce the  
4       frictional hysteresis force when said pedal arm is released.

1           17.      The pedal assembly of claim 14 wherein said friction lever  
2       includes an integrally formed main member and an upper arcuate member  
3       extending forwardly from an upper end of said main member, and an upper  
4       surface of said friction lever upper member is abraded to frictionally engage  
5       said housing friction wall.

1           18.      The pedal assembly of claim 14 further comprising a push arm  
2       pivotally mounted to said pedal arm at a push arm pivot point that is radially  
3       inward from said friction lever pivot point, wherein said push arm is in contact  
4       with said friction lever, such that said spring forces said push arm against said  
5       friction lever to generate the frictional hysteresis force.

1           19.      The pedal assembly as set forth in claim 14 wherein said  
2       hysteresis generating means includes:

3           a friction wall extending radially from said housing front wall, wherein  
4        said friction wall includes an arcuate frictional surface, and is positioned  
5        between said housing rear wall and said pedal arm; and  
6           a friction lever having a first portion pivotally mounted to said pedal  
7        arm and a second portion in frictional contact with said friction wall to generate  
8        a frictional hysteresis force during actuation of said pedal arm.

1           20. An electronically controlled pedal assembly with hysteresis  
2        comprising:

3           a mounting bracket;

4           a pedal arm;

5           a pedal support arm extending between said bracket and said pedal arm,  
6        wherein said pedal arm is pivotally mounted to said pedal support arm at a  
7        pedal arm pivot point using a pedal arm mounting means and said pedal  
8        support arm is pivotally mounted to said mounting bracket a pedal support arm  
9        pivot point using a support arm mounting means;

10          a hysteresis generating means operatively supported on said support  
11        arm mounting means at said pedal support arm pivot point, wherein said  
12        hysteresis device includes a torsion spring having two arms with one arm  
13        having a hook end, and a friction spacer having a cylindrical portion and an  
14        outer helical flange, wherein said friction spacer is disposed within the torsion  
15        spring such that the outer flange of said friction spacer fits between said coils  
16        of said coil spring, such that rotation of said support arm creates a frictional

17        hysteresis force between said torsion spring and said friction spacer that is  
18        translated back through said pedal arm.

1            21.      The pedal assembly of claim 20 wherein said friction spacer  
2        includes a longitudinally extending slit.

1            22.      The pedal assembly of claim 21 wherein said mounting means is  
2        a pivot pin.

1            23.      An electronically controlled pedal assembly with hysteresis  
2        comprising:

3            a housing having a front wall and an arcuate friction wall extending  
4        from an edge of said front wall, wherein said friction wall has a radius of  
5        curvature centered on a pedal arm pivot point;

6            a pedal arm rotatably supported, at said pedal arm pivot point by a  
7        mounting means operatively connected to said housing;

8            a hysteresis generating means pivotally mounted to said pedal arm;

9            a spring positioned between said housing and said hysteresis generating  
10        means, wherein said spring biases said hysteresis generating means against said  
11        housing, such that depression of said pedal arm compresses said spring while  
12        generating an increasing frictional hysteresis force between said arcuate  
13        friction wall and said hysteresis generating means that is translated back

14 through said pedal arm, and release of said pedal arm reduces the frictional  
15 hysteresis force;

16 a cap connected to said housing having an alignment post extending  
17 radially from a face portion of said cap, and said alignment post aligns said cap  
18 with said pedal arm pivot point; and having a plurality of mounting posts  
19 extending radially from a cap face portion; and

20 an induction sensor for sensing the position of said pedal arm  
21 operatively mounted on said cap pedal arm pivot point alignment post and said  
22 cap mounting posts, wherein said induction sensor includes a first rotor and a  
23 second rotor and a stator suspended between said first and second rotors.

1 24. The pedal assembly of claim 23 wherein said hysteresis  
2 generating means is a friction lever pivotally mounted to an outer end of said  
3 pedal arm at a friction lever pivot point.

1 25. The pedal assembly of claim 24 wherein said friction lever  
2 includes an integrally formed main member, a lower member extending  
3 radially from a lower end of said main member and an upper arcuate member  
4 extending radially from an upper end of said main member, and an upper  
5 surface of said upper arcuate member is abraded to frictionally engage an  
6 arcuate surface of said housing.

1           26. The pedal assembly of claim 25 wherein said friction lever  
2 upper arcuate member is canted toward said housing friction wall to increase a  
3 frictional hysteresis force when said pedal arm is depressed and reduce the  
4 frictional hysteresis force when said pedal arm is released.

1           27. The pedal assembly of claim 24 wherein said friction lever  
2 includes an integrally formed main member and an upper arcuate member  
3 extending forwardly from an upper end of said main member, and an upper  
4 surface of said friction lever upper member is abraded to frictionally engage  
5 said housing friction wall.

1           28. The pedal assembly of claim 23 wherein said hysteresis  
2 generating means includes:

3                 a friction lever pivotally mounted to said pedal arm at a friction lever  
4 pivot point;

5                 a push arm pivotally mounted to said pedal arm at a push arm pivot  
6 point that is radially inward from said friction lever pivot point, wherein said  
7 push arm is in contact with said friction lever, such that said spring forces said  
8 push arm against said friction lever to generate the frictional hysteresis force.

1           29. The pedal assembly of claim 23 wherein said mounting means is  
2 a post and bushing.

1           30. The pedal assembly of claim 23 wherein said hysteresis  
2 generating means includes:

3                 a friction wall extending radially from said housing front wall, wherein  
4 said friction wall includes an arcuate frictional surface, and is positioned  
5 between said housing rear wall and said pedal arm; and

6                 a friction lever having a first portion pivotally mounted to said pedal  
7 arm and a second portion in frictional contact with said friction wall to generate  
8 a frictional hysteresis force during actuation of said pedal arm.

1           31. The pedal assembly of claim 23 wherein said cap alignment post  
2 is operatively supported on said pedal arm mounting means.

1           32. The pedal assembly of claim 31 wherein said cap includes at  
2 least one slot for securing the cap assembly to said housing in a predetermined  
3 position.

1           33. The pedal assembly of claim 32 wherein said first rotor includes  
2 a generally planar member with conductive plates positioned above a radially  
3 extending center post, and said second rotor is a generally planar member with  
4 conductive plates positioned thereon relative to said first rotor conductive  
5 plates and a center mounting aperture, and said stator is mounted onto a  
6 generally planar circuit board supported by said cap mounting posts.